



Diverticular disease

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Outline

- Introduction
- Epidemiology
- Pathology
- Pathogenesis
- Clinical presentation
- SUDD
- Diverticulitis
- SCAD

Introduction

- Colonic diverticulum is a localized structural deformation resulting in a pocket like outpouching of the colonic wall
- Colonic diverticulosis is the presence of multiple diverticula
- “pseudodiverticulum” vs true diverticulum
- First described in the late 1700s by Alexis Littre
- Jean Cruveilhier is credited with the first clear pathological description in 1849

First paper on diverticular disease among Africans

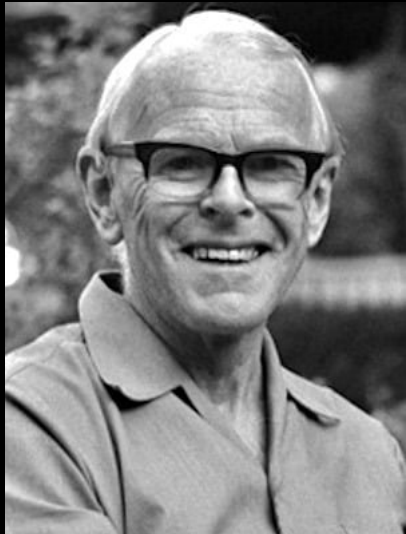
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BRITISH MEDICAL JOURNAL 22 MAY 1971

For Debate . . .

Diverticular Disease of the Colon: A Deficiency Disease of Western Civilization

NEIL S. PAINTER, DENIS P. BURKITT



DIVERTICULAR DISEASE IN AFRICA

Africa was least affected by the economic changes that occurred elsewhere just over a century ago, and our studies emphasize the almost total absence of diverticular disease in the rural Africans. During 20 years of practising surgery in Africa, mostly in a teaching hospital, one of us (D.P.B.) encountered not a single case of diverticulitis, nor did his surgical colleagues see the condition.

In the 2,000-bed Baragwanath Hospital, Johannesburg, serving the most urbanized Africans, Keeley⁴⁵ found no diverticula in 2,367 necropsies from 1954 to 1956, and Solomon⁴⁶ saw none in 600 barium enema examinations. The disease is extremely rare in the Bantu.⁴⁷

At Mulago Hospital, Kampala, Davies found only two diverticula in 4,000 necropsies in 15 years.⁴⁸ Hutt⁴⁹ saw none in eight years in his pathological department, while Templeton⁵⁰ found only three caecal diverticula in 300 colons carefully scrutinized at necropsy. In Nairobi Miller⁵¹ saw diverticulitis once in the past 11 years, and Chapman⁵² saw one case in Durban in 14 years. Jain⁵³ served nine years in the Congo and Badoe⁵⁴ 16 years in Ghana, but both saw diverticulitis only once. Admittedly, diverticulosis might be missed where facilities are limited, but it is inconceivable that diverticulitis would be unrecognized consistently at major African hospitals with first-class staff and equipment and extensive necropsy experience. As the disease is so rare, even in African teaching hospitals, it is not surprising that 37 questionnaires completed recently by doctors serving in rural African hospitals showed that they had seen only two cases of diverticular disease between them, though some of them had had over 20 years' experience in Africa.

Epidemiology

- True incidence and prevalence not clear, since the majority of patients are asymptomatic
- Prevalence increases with age: less than 10% if <40y/o, to 66% in those >80y/o
- Disease of the western civilization
- Increasing prevalence in other countries as well
- In 2010 in the US:
 - 8th most common GI diagnosis in ambulatory visits, with 2.7mil visits
- USD 2.2 billion cost in 2012

In Africa

- Paucity of studies
- Recent studies seem to show an increase from Painter's study
- Archampong et al in Ghana (1978): 14 cases diagnosed over 3 yrs
- Segal: 42 cases over 3 yrs at Bara (16 men and 26 women) (1982)
 - Urban population
 - Main presentation: Rectal bleeding, abdominal mass, pain
 - Average age: 62
- Madiba et al: Durban, reported 26 cases over 5 years (1994)
 - Most common presentation was rectal bleeding, and 77% were left sided

An investigation of diverticular disease among black patients undergoing colonoscopy at Dr George Mukhari Academic Hospital, Pretoria, South Africa

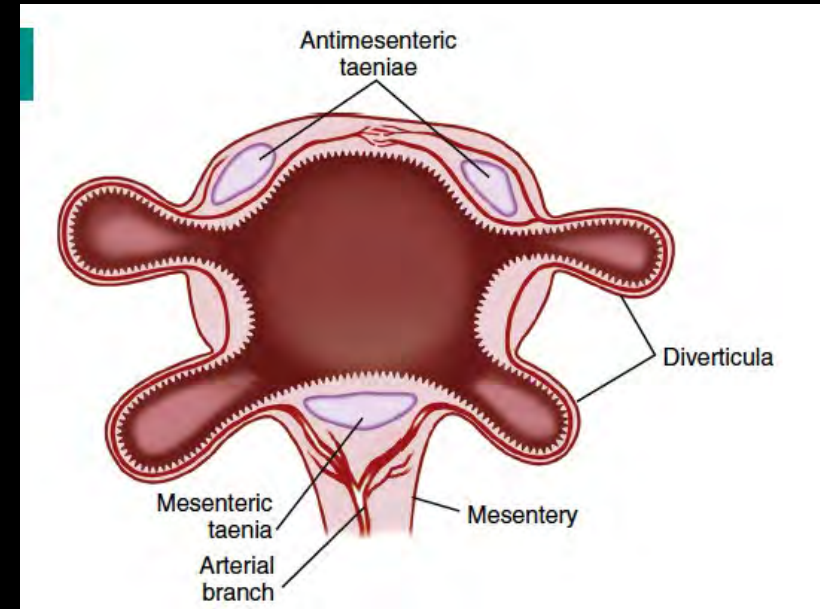
M Vally ¹, M Z Koto, M Govender

Results: Of 348 patients who had undergone colonoscopies and who were eligible for inclusion in this study, 47 were diagnosed with diverticular disease - a prevalence of 13.50% (95% confidence interval 10.30 - 17.50). The greatest number of patients diagnosed were in their 7th and 8th decades, with an age range of 46 - 86 (mean 67) years. There was a female predominance of 57.45%. Lower gastrointestinal bleeding was the most common (65.96%) indication for colonoscopy. The left colon was most commonly involved (72.34%), followed by the right colon (55.31%). A substantial number of patients had pancolonic involvement (27.65%).

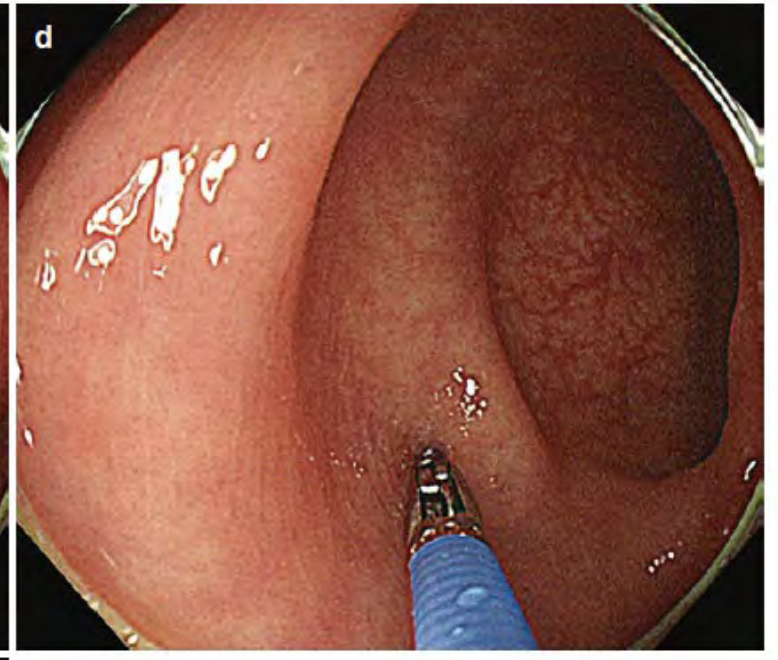
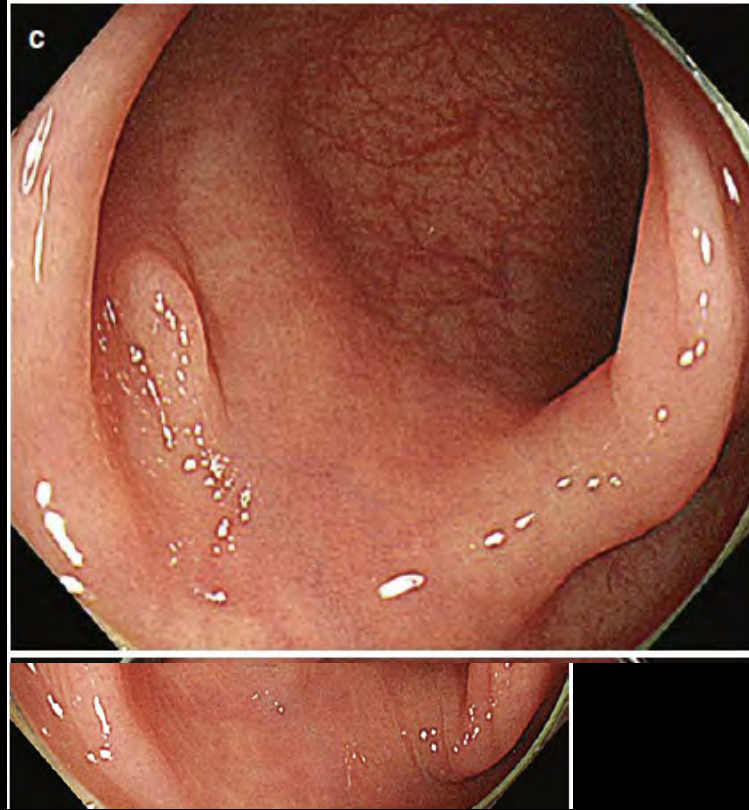
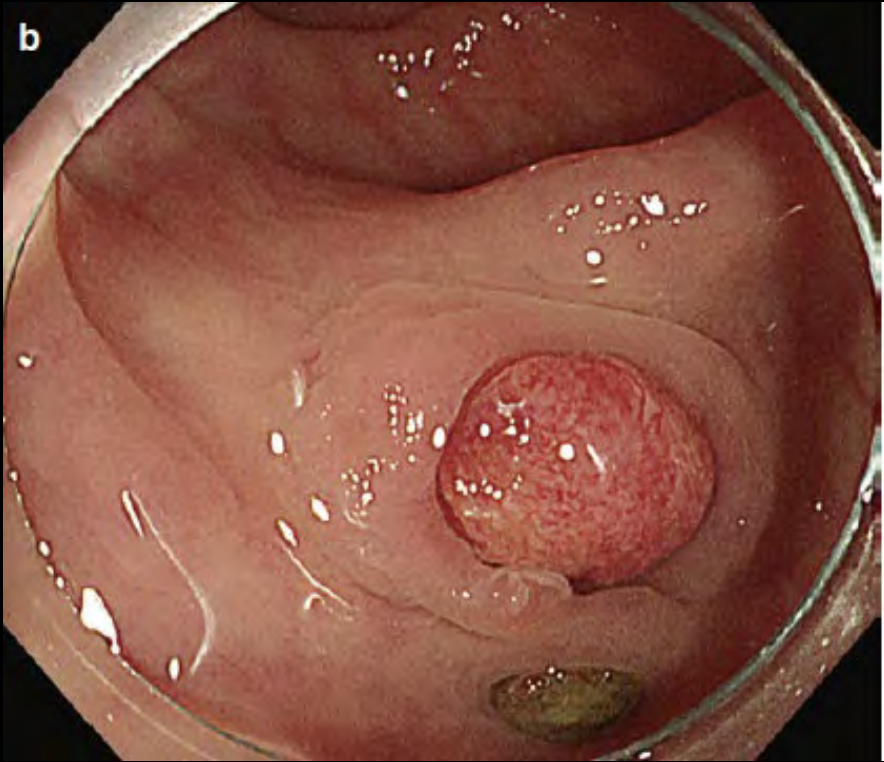
Conclusion: This retrospective study suggests that there has been a considerable increase in the prevalence of diverticular disease among black South Africans, possibly owing to changes in dietary habits and socioeconomic status.

Pathology

- Originate in 4 distinct rows at sites of penetration of the branches of the vasa recta on the anti-mesenteric taeniae
- Point to the mesenteric border
- Can vary in number, solitary to hundreds
- Can vary in size as well
- Can invert and resemble polyps
- Site:
 - Western countries: 90% on the left
 - Asian countries: 75-85% are right sided



Inverted diverticula



Pathogenesis

- Multifactorial and incompletely understood
- Investigations have focused on:
 - Colonic wall structure
 - Colonic motility
 - Environmental factors
 - Hereditary factors

Colonic wall structure

- Markedly thickened muscle layers
- Accordion like pleating of the folds
 - Myochosis
- No muscle hyperplasia/hypertrophy
- Increased elastin deposition

Environmental factors

- Low fibre in diet
 - Association now less clear
- Red meat
- Smoking and alcohol
- Physical inactivity
- Obesity
- NSAID use

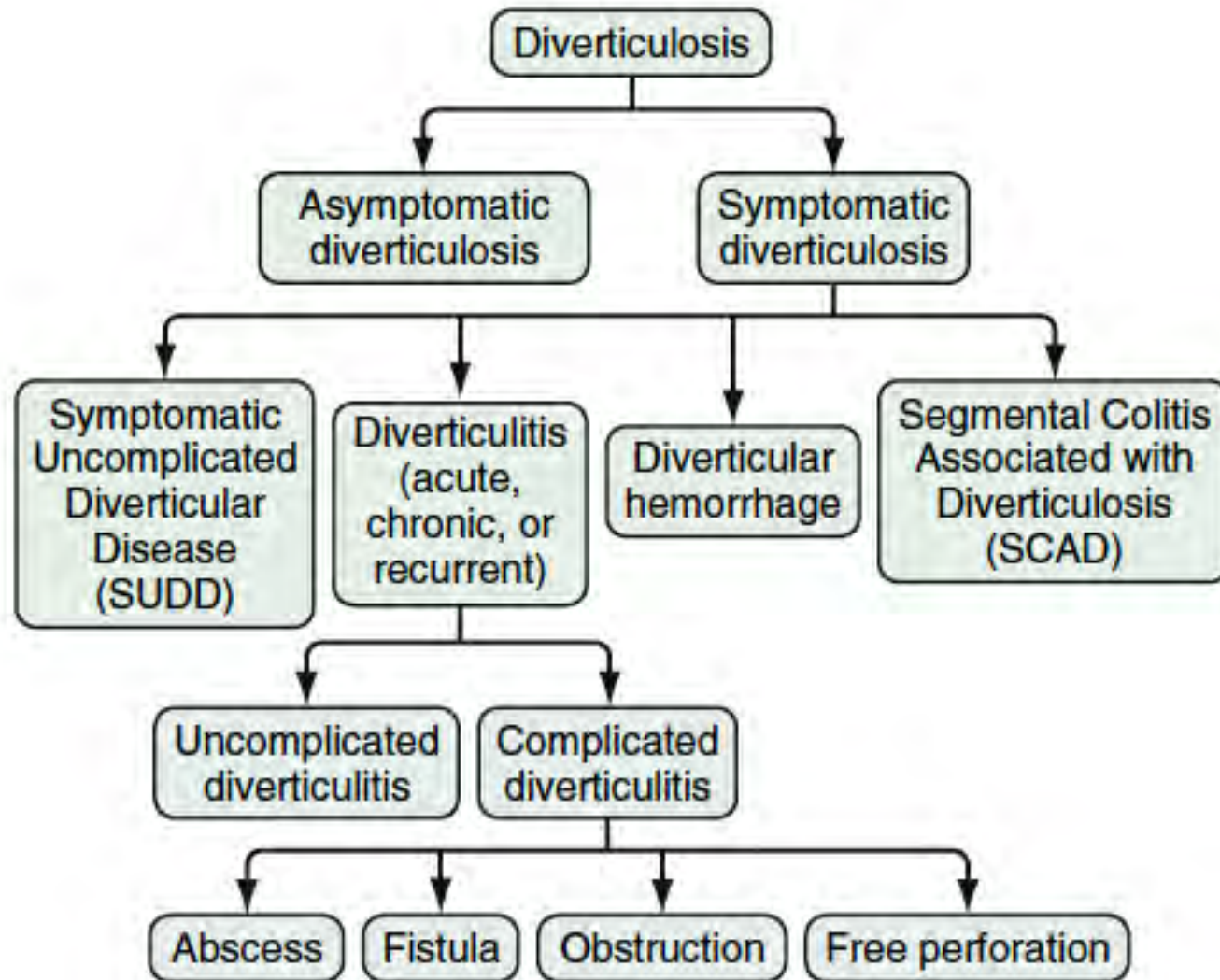
Motility

- Higher resting, postprandial and neostigmine stimulated luminal pressure
- Pts with symptomatic diverticular disease have high motility indices
- Motility abnormal in both magnitude and direction
- Physiological basis of this not clear

Heritable factors

- Men=women
- ?more diverticulitis in women
- Familial aggregation
 - Siblings 3X more likely
- T-cell receptor gene implicated
 - TNFSF15

Clinical presentations



Symptomatic uncomplicated diverticular disease (SUDDD)

- Non specific abdominal complaints in patients with diverticulosis
 - No complications of diverticular disease
- True prevalence is unknown
 - Confounded by IBS: share clinical features
- One study by Salem and colleagues
 - 119 subjects followed over a median duration of 66 months
 - 97% had few/no symptoms
 - 1.7% had an episode of acute diverticulitis
 - 1 pt required surgery

Pathophysiology

- ? Late consequence of IBS
- ? Shared pathophysiology with IBS\
- 1. Visceral hypersensitivity
- 2. Chronic inflammation
- 3. Colonic motility
- 4. Altered intestinal microbiota

Clinical features

- LLQ abdominal pain
- Relieved by defecation or passage of flatus
- Bloating, diarrhoea, constipation, passage of mucus
- Overlap with IBS

SUDD

Investigations

1. Colonoscopy
2. CT abdomen or CT Colonography
3. Barium enema
4. Normal lab results
5. Higher fecal calprotectin than controls and IBS patients (small case-controlled study)

Treatment

1. ?Soluble fiber (psyllium)
2. ?5-ASA
3. ?Rifaximin
4. ?Probiotics
5. Anti-cholinergics and anti-spasmodics
6. Surgery, no clear role

Diverticulitis

- Inflammation and/or infection of a diverticulum
- Heterogenous disease with several presentations
 - Acute uncomplicated diverticulitis- 88% in a population study
 - Complicated diverticulitis
 - Phlegmon
 - Abscess
 - Stricture
 - Perforation, peritonitis
 - Fistula
 - Chronic/smoldering diverticulitis
 - Weeks to months

Pathophysiology

- Neck of diverticulum becomes obstructed by inspissated stool
 - Fecalith abrades the mucosa with low grade inflammation following
- Increased normal flora and localized ischaemia from reduced venous outflow
- Altered mucosal defenses
 - Defective CD2 pathway induced apoptosis
- Role of CMV reactivation?
- Bacteria can breach the mucosa and extend the process transmurally
 - Perforation

Clinical features

- LLQ pain (or RLQ pain in Asian patients)
 - Intermittent or continuous
 - Associated with change in bowel habits
- Anorexia/N&V
- Fever
- Dysuria and urinary frequency (sympathetic cystitis)
- Complicated diverticulitis
 - Tender abdomen and mass signifying an abscess
 - Fistulae: colovesicular/colovaginal/coloenteric/colocutaneous
 - Obstruction: partial obstruction; pericolic inflammation/extrinsic compression
 - Free perforation with peritonitis

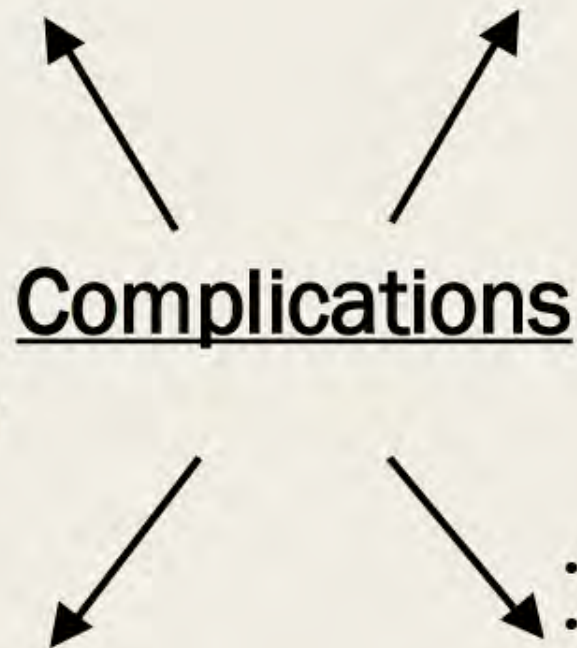
Obstruction

1. Luminal narrowing from peri-colic inflammation, compression from an abscess
2. SBO can occur
3. Complete obstruction is unusual, unless from stricturing (recurrent episodes of diverticulitis)
4. Endoscopic dilatation/ SEMs
5. Bowel rest, NGT suction, antibiotics if not improving then for surgery

Free perforation

1. Faecal peritonitis caused by free perforation
2. Uncommon 4/100 000 cases
3. Mortality 12-26%
4. Plain x-rays showing free air, clinical diagnosis or CT
5. Surgical emergency (usually 2-staged)

Complications



Abscess formation

1. 15% of patients with diverticulitis
2. Tender mass, persistent leukocytosis, fever despite adequate trial of abx
3. CT abdomen
4. Hinchey classification
5. <3-4cm: can resolve with anti-biotics alone
6. CT-guided percutaneous/ trans-rectal/transvaginal drainage
7. Elective open or laparoscopic surgery

Fistula

- Abscess ruptures into an adjacent organ
- 5% of patients with diverticulitis but present in 20% who require surgery
- Colovesicular: most common type (65%) males>females
- Faecaluria, pneumaturia, UTIs
- Cystoscopy, cystography or barium enema
- Colovaginal: 2nd most common (25%)
- Single-staged surgery with repair of fistula and primary anastomosis (8% mortality)

Investigations

- Leukocytosis with left shift
- CRP>50mg/l
- Imaging: vital
 - CT AP: with water soluble contrast
 - Bowel wall thickening, pericolic fat stranding, pericolic collections, abscesses, extravasated contrast
 - Plain films for perforation
 - Contrast barium enema: if other tests are unavailable
 - USS
 - MRI
- Endoscopy: to be avoided due to risk of perforation
 - Unclear cases, ltd flex sig considered to exclude alternative diagnoses

Treatment- indications for admission

- Complicated diverticulitis (ie, frank perforation, abscess, obstruction, fistula)
- Sepsis or SIRS (>1 of temperature >38° or <36° Celsius, heart rate >90 beats per minute, respiration rate >20 respirations per minute, white blood cell count >12,000/mL or <4000/mL, C-reactive protein >15 mg/dL)
- Severe abdominal pain or diffuse peritonitis, and/or failure to reduce abdominal pain in the emergency department to <5 on a VAS
- Microperforation (eg, a few air bubbles outside of the colon without contrast extravasation or phlegmon)
- Age >70 years
- Significant comorbidities (eg, diabetes mellitus with organ involvement [eg, retinopathy, angiopathy, nephropathy], recent cardiogenic event [eg, acute myocardial infarction, angina, heart failure], or recent decompensation of chronic liver disease [$\geq$ Child B] or end-stage kidney disease)
- Immunosuppression (eg, poorly controlled diabetes mellitus, chronic high-dose corticosteroid use, use of other immunosuppressive agents, advanced HIV infection or AIDS, B or T cell leukocyte deficiency, active cancer of hematologic malignancy, or organ transplant)
- Intolerance of oral intake secondary to bowel obstruction or ileus
- Nonadherence with care/unreliability for return visits/lack of support system
- Failure of outpatient treatment

Antibiotics

- Paradigm shift in treatment over the last 10-15 years
 - Standard antibiotic use now called into question
- 2012 Cochrane review showed no difference in outcomes for uncomplicated diverticulitis
- AVOD and DIABOLO trials: Abx for acute uncomplicated diverticulitis did not accelerate recovery
 - No prevention of complications or recurrence: AVOD
- ACG 2026: suggests against routine antibiotics for low risk pts with acute uncomplicated diverticulitis

Antibiotic or no antibiotics?

Patients with acute uncomplicated diverticulitis appropriate for initial nonantibiotic management are those who

All of the following must be present

- Immunocompetent
- Outpatient
- Have no evidence of complicated disease
- Hemodynamically stable
- No signs of systemic inflammatory response (fever, tachycardia, leukocytosis)
- Not medically frail
- Able to tolerate oral intake
- No recent antibiotic use
- Reliable follow-up and adequate social support

Antibiotics are reasonable for patients with acute uncomplicated diverticulitis who have

- Immunocompromise
- Frailty
- Significant comorbid conditions
- Clinical deterioration or persistent/worsening symptoms
- Inability to tolerate oral intake
- Vomiting
- Elevated inflammatory markers (e.g., markedly elevated C-reactive protein)
- Imaging features associated with higher risk (e.g., fluid collection or longer segment of inflammation)
- Inadequate outpatient support or inability to ensure close follow-up

Which antibiotics?

When antibiotics are used for outpatient treatment of acute uncomplicated diverticulitis, several options are appropriate

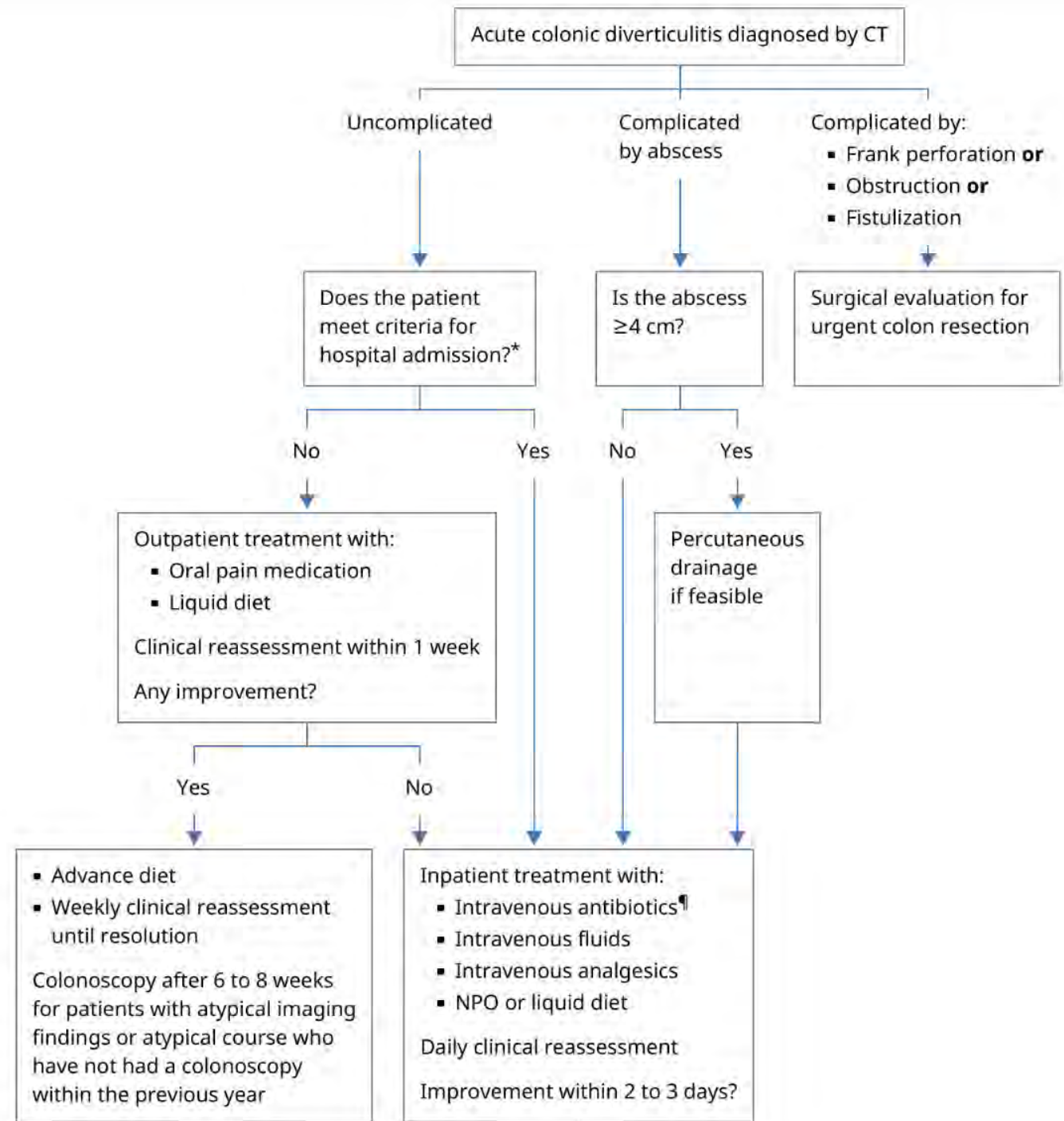
Monotherapy with

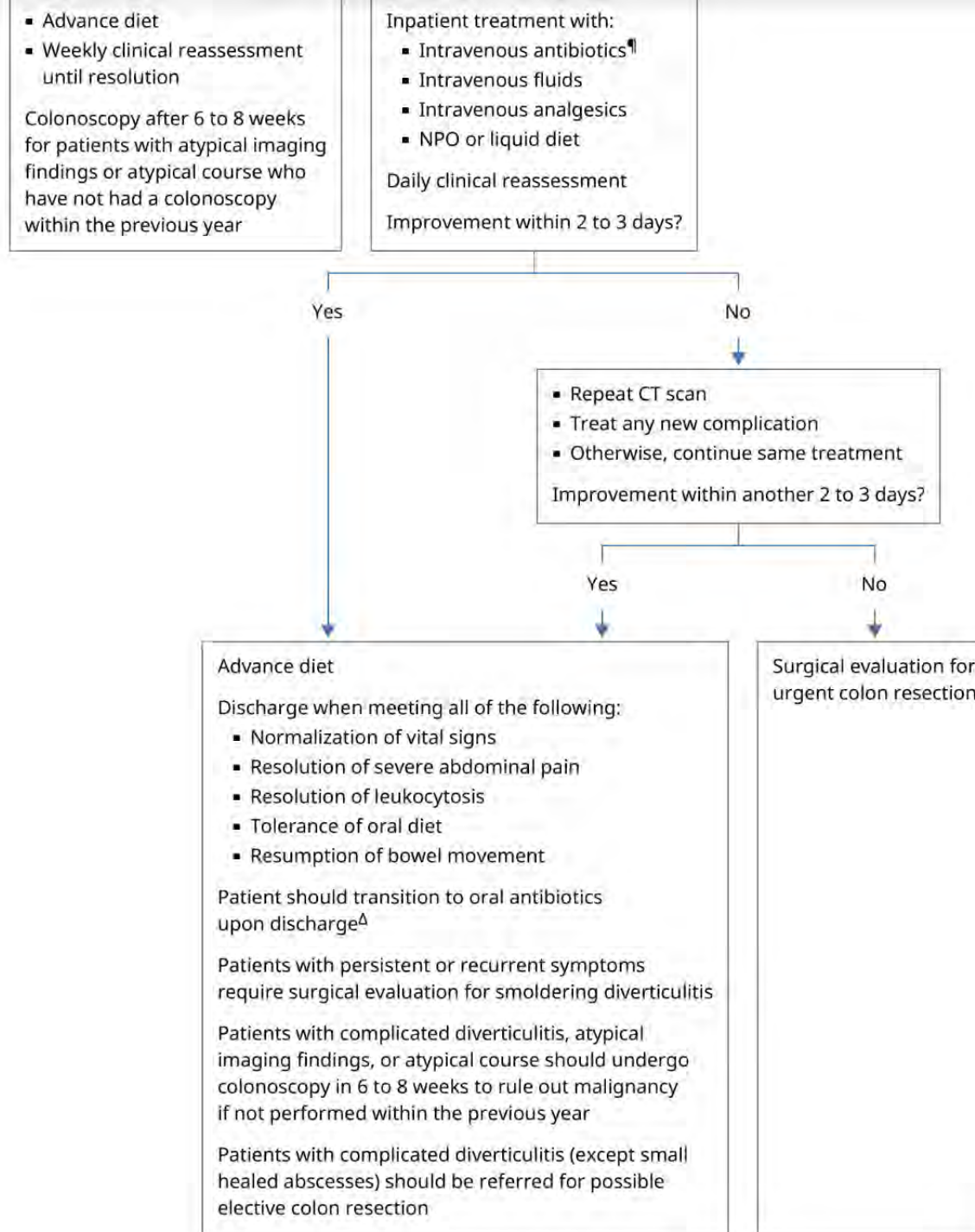
- Amoxicillin-clavulanic acid 875 mg/125 mg orally every 12 h
- Moxifloxacin 400 mg orally daily

Combination therapy with

- Metronidazole 500 mg orally every 8 h plus
- Trimethoprim-sulfamethoxazole (1 double strength tablet, 160/800 mg) every 12 h or
- Ciprofloxacin 500 mg every 12 h or
- Levofloxacin 500 mg every 24 h

Treatment algorithm





Role of colonoscopy

- ACG recommend colonoscopy after recovery from an episode of **complicated** diverticulitis to rule out missed cancer or premalignant lesions
- Suggest colonoscopy after **uncomplicated** diverticulitis if alarm symptoms or not current with colon cancer screening
- Complicated diverticulitis associated with a **6x odds of colon cancer** as compared to uncomplicated diverticulitis
- US national registry showed 4x increased risk of CRC with complicated diverticulitis and no increased risk in uncomplicated diverticulitis
- Scope to be done after 6-8 weeks of acute diverticulitis episode

Prevention of recurrence-ACG

- Healthy diet
 - High in fruits/vegetables, whole grains and legumes
 - Limited consumption of red meat, processed grains, trans fats and sweets
- Avoid regular use of NSAIDs after recovery from acute diverticulitis
- Smoking cessation
- If heavy alcohol consumption, advise on moderation
- If overweight, weight reduction
- Regular physical activity

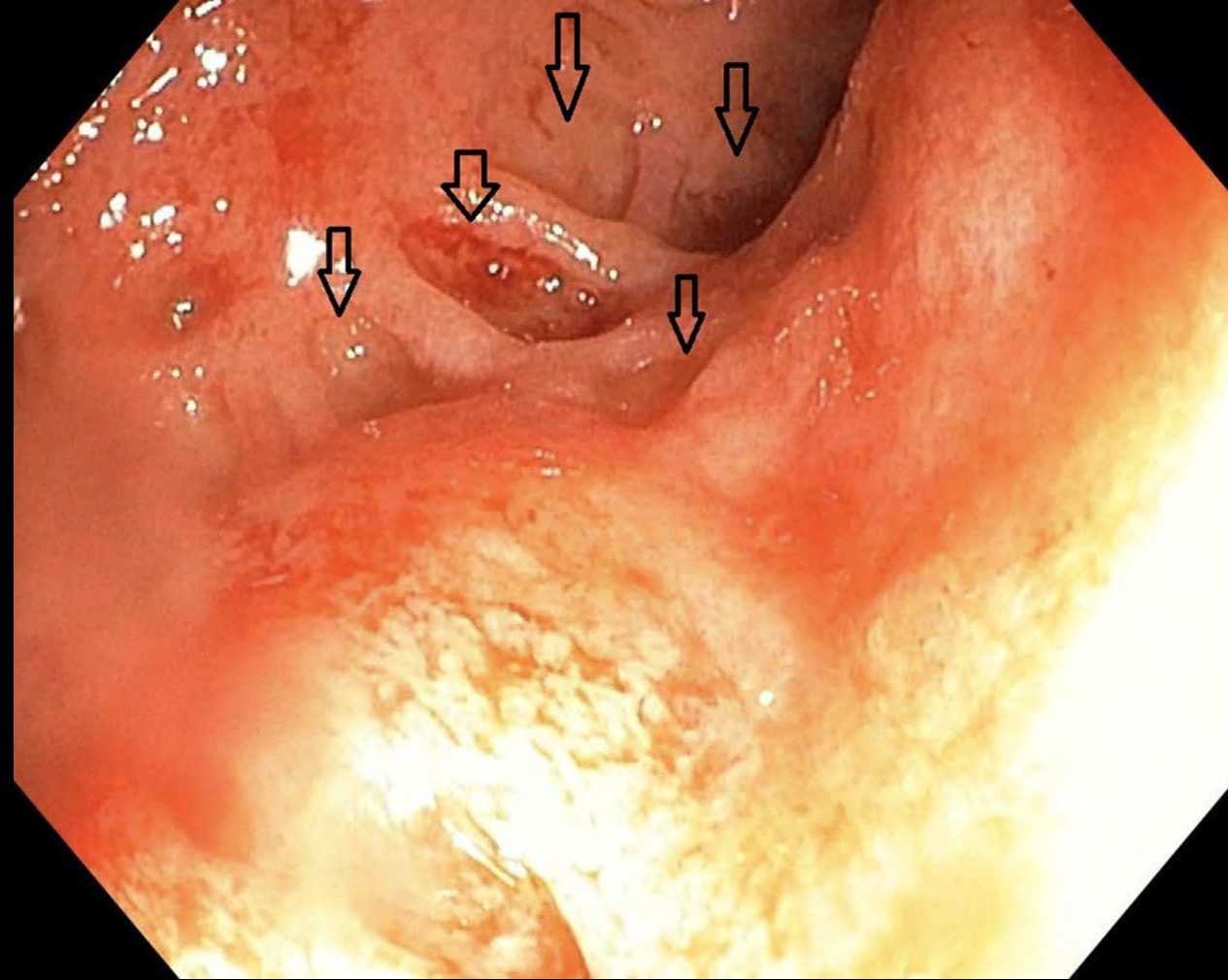
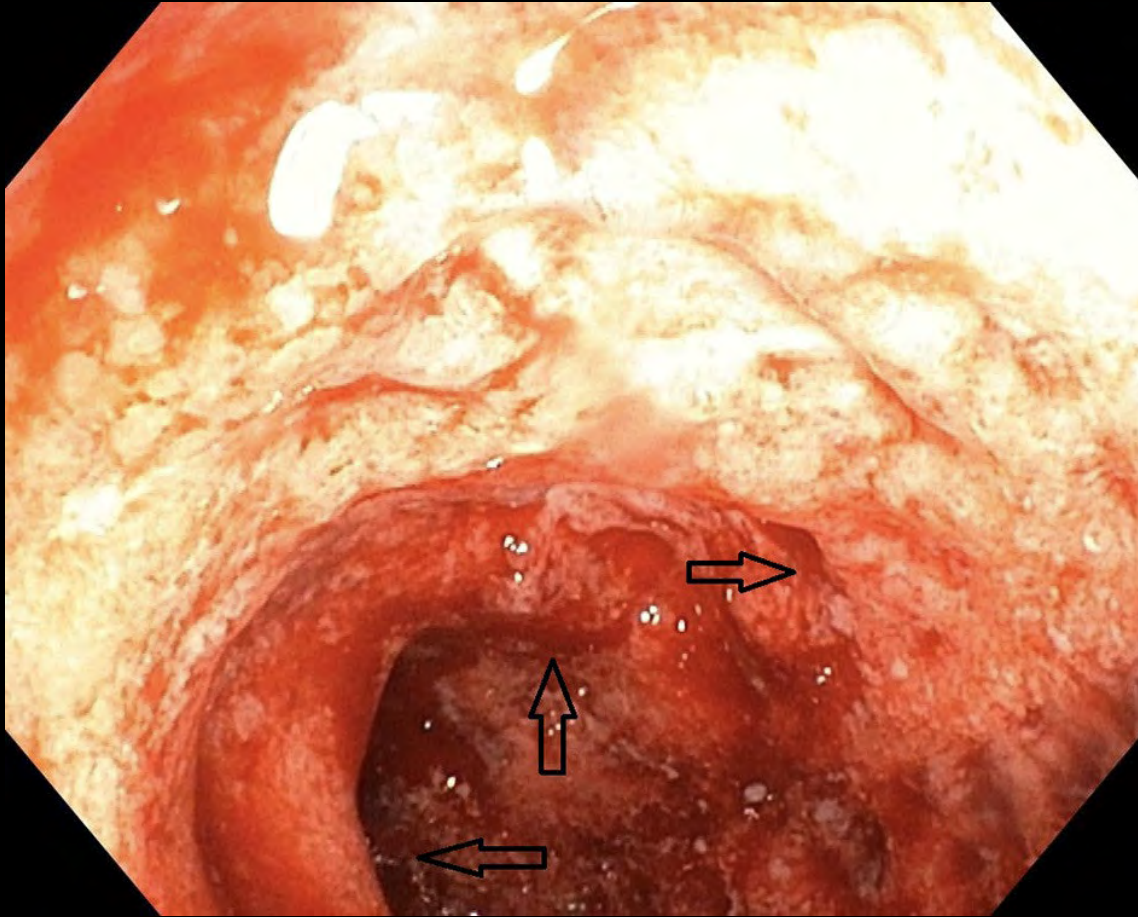
Surgery in uncomplicated diverticulitis

- Decision need to be individualized
- Pts with recurrent uncomplicated diverticulitis that significantly impair QoL should be referred for surgical review
- Previously, surgery was recommended after 2 episodes of diverticulitis- not supported by evidence
- Elective surgery reduces (not eliminate) risk of recurrence-60% vs 15% at 5 yrs
- Need to be balanced against the risk of surgery:
 - Infection, iatrogenic injury, anastomotic leak, strictures/incisional hernia etc

Interventions not recommended

- Probiotics
- Mesalamine
- Rifaximin

Segmental colitis associated with diverticulosis (SCAD)



Segmental colitis associated with diverticulosis (SCAD)

- Chronic mucosal inflammation in a segment with diverticula
- Rare diagnosis, prevalence of 1.5%
 - More common in males and older adults
- Pathogenesis is unclear
 - Mucosal prolapse, fecal stasis and localized ischaemia implicated
 - ?changes in bacterial flora in stasis
 - Altered permeability to intraluminal antigens?

Clinical features

- Clinical manifestations
 - Chronic diarrhea
 - Cramping abdominal pain
 - Intermittent haematochezia
- Imaging: evidence of colonic wall thickening and pericolonic fat stranding
- Labs: Raised fecal calprotectin and lactoferrin

Diagnosis

- On endoscopy during evaluation of chronic diarrhea or abdominal pain
 - Hx of diverticulitis not necessary
- 4 subtypes of endoscopic features
- Type A: Crescentic fold pattern
 - Reddish round lesions at the top of colonic folds
- Type B: mild/moderate UC-like
 - Loss of vascular pattern, oedema/hyperemia and diffuse erosions
- Type C: Crohns-like
 - Isolated aphthae
- Type D: severe UC-like

Disease course

- Poorly understood
- 15 patients followed up for 7 years
 - 8 had no clinical recurrence
 - 2 diagnosed with Crohn's disease on follow up
- 27 patients followed up for 5 years
 - The more severe the endoscopic findings, the more severe was the clinical course, and more often required immunosuppression

Management

- Optimal treatment not well defined
- First line: Ciprofloxacin 500mg BD and Metronidazole 10mg/kg TDS for 10-14 days
- If no response: add oral mesalamine 800mg TDS for 7-10 days
 - Inadequate response in 2-4 weeks, increase dose to 1600mg TDS
- If no response: prednisone 40mg Od for 1 week and wean off to stop in 6 weeks
- Segmental resection if steroid refractory/dependent
- Ltd data on immunomodulators/biologics

Diverticular bleeding

- Covered in the last talk
 - <https://youtu.be/N6baleShv8s>
 - [https://www.gastrofoundation.co.za/Content/Images/Approach to Lower GI Bleeding Dr Yaaseen Sungay.pdf](https://www.gastrofoundation.co.za/Content/Images/Approach%20to%20Lower%20GI%20Bleeding%20Dr%20Yaaseen%20Sungay.pdf)



- Thank you
- Questions or comments?

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